

ABSTRACT OF THE DISCLOSURE

Embodiments of the invention provide a non-chemically amplified photoresist, which results in reduced line wide roughness (LWR). In accordance with one embodiment the photoresist includes a developer-soluble resin (DSR) and a photoactive compound (PAC). For one embodiment of the invention, the even distribution of the PAC within the DSR results in reduced acid diffusion thus reducing LWR. Prior to exposure to the light source, the PAC inhibits solubility of the DSR in the developer. Upon exposure the PAC converts to acid to promote solubility of the DSR. The even distribution of the PAC within the photoresist results in reduced LWR and a reduction in defects. For one embodiment the photoresist is applied in the EUV technology (e.g., wavelength is 13.4 nm). For such an embodiment the LWR may be reduced to less than 1.5 nm allowing for effective fabrication of devices having feature sizes of approximately 15 nm.